

A new species of *Lestrolepis* from the Red Sea, with redescription of *Lestrolepis pofi* (Harry, 1953) (Aulopiformes: Paralepididae)

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Abstract

A new species of the genus *Lestrolepis* is described based on 6 specimens collected from the Red Sea. The species differs from the congeners in having 31–34 anal-fin rays, 63–65 total lateral-line scales, 28–30 prehaemal vertebrae and 79–81 total vertebrae. *Lestidium pofi* Harry, previously recognized as a junior synonym of “*Lestrolepis*” *luetkeni* (Ege), is recognized as a valid species of *Lestrolepis*. A redescription of *pofi* is provided, based on specimens collected from off Hawaii, Japan, Madagascar and Australia.

Key words: Pisces, taxonomy, new species, Paralepididae, Red Sea

Introduction

While working on the collection of MNHN, Paris, the first author identified two different forms recognized as “*Lestrolepis luetkeni* (Ege, 1933)” (type locality: Mozambique Channel), one from off Madagascar and one from the Red Sea. Although both possessed a light organ at the front margin of orbit and fewer than 35 anal-fin rays, meristics and other morphometric characters separated them.

Lestidium pofi Harry, 1953 was recognized as a junior synonym of “*Lestrolepis*” *luetkeni* (Ege, 1933) by recent authors (e.g. Mundy, 2005), but was previously considered valid in the Red Sea (Dor, 1970). Further investigation of the nomenclature discovered that Rofen (1966, previously R. R. Harry) never provided sufficient evidence justifying synonymizing *pofi* with *luetkeni* (in *Lestrolepis*), and he expressed some doubts. Examination on the holotype of *Paralepis luetkeni* has revealed that it does not possess the diagnostic light organ at the anterior margin of orbit, so was clearly a different genus to *Lestrolepis*. Moreover, it was distinct to *Lestrolepis pofi*. *Paralepis luetkeni* Ege, 1933 is tentatively placed in the genus *Lestidiops*, which needs further investigation.

The Madagascar specimens agree well with the type, and with additional specimens of *Lestrolepis pofi* examined by the authors, the species is accordingly recognized as valid. The Red Sea population may have been listed as *Lestrolepis pofi* by Dor (1970), but we could not locate his voucher (DG, pers. obser.). Based on six specimens found in the collections, we recognized the Red Sea population as a new species and a formal description and name are provided.

The members of *Lestrolepis* (i.e. those paralepidids with a light organ at the anterior margin of orbit) are *L. intermedia* (*Sudis vanderbilti* Fowler a junior synonym) from the Atlantic Ocean, *L. japonica* (*Paralepis philippinus* Fowler a junior synonym), *L. pofi* from the Indo-Pacific Ocean, and the new species from the Red Sea described herein. A fifth species from the northwestern Pacific is being described in a separated paper by HCH.

Methods and materials

Measurements followed Harry (1951). Standard length (SL) is used throughout. Head depth is the vertical depth through the middle of eye. Lower jaw is measured from anterior tip to the posterior end of articular bone (below middle of eye). Lateral-line scales are presented as several counts: prepelvic, predorsal, preanal, and total. Vertebral counts are likewise presented in several counts: prehaemal, caudal, prepelvic, predorsal, preanal, and total. The prepelvic, predorsal, preanal vertebral counts usually corresponding with those of the lateral-line scales in paralepidids and, as such, are useful indications of the relative position of origins of the fins, especially when the specimens are twisted and cannot be measured accurately. Abbreviations: V–D = space between pelvic- and dorsal- fin origins; V–A = space between pelvic- and anal- fin origins.

Taxonomy

Family Paralepididae

Lestrolepis pofi (Harry, 1953)

Fig. 1A–D; Tables 1–2

Lestidium pofi Harry, 1953:189, figs. 6, 12 (Christmas Island, Line Islands, near surface).

Lestrolepis luetkeni (not of Ege): Paxton & Niem, 1999:1949 (listed, western central Pacific); Fukui & Ozawa, 2004:293; Mundy, 2005:206 (listed, Hawaii); Nakabo, 2002:371; Nakabo & Kai, 2013:443 (key, Japan); Hata *et al.*, 2018:278, fig. 1 (description, Japan).

Lestrolepis pofi: Rofen, 1960:201 (new data; Key); Rofen, 1966:305 (Key, possible synonym of *Lestrolepis luetkeni*, with a question mark).

Lestidium nudum (not of Gilbert): ?Matsubara, 1941:9 (Suruga Bay, Shizuoka Prefecture, Japan).

Materials examined. Holotype. USNM 163316 (130.3), Kiritimati (Christmas Island), Line Islands, Pacific Ocean, no other data.

Non-type. AMS I.41972-018 (1 specimen, 87.0 mm SL), AMS I.42066-001 (1, 155), AMS I.42069-003 (1, 108), AMS I.42202-009 (1, 116), AMS I.42209-002 (2, 108–119), AMS I.42215-007 (1, 183), AMS I.42435-003 (4, 165–183), AMS I.43014-002 (1, 164), all from off Queensland, Coral Sea, northeastern Australia. BPBM 23525 (2, 142–144), R/V Townsend Cromwell, cruise 19, Oahu, near Barbers Point, 25 Sep. 1965. BPBM 25185 (1, 137), R/V "Charles H. Gilbert" cruise 45, Oahu, anchorage 700 yards off Brown's Camp, 9 Aug. 1959. BPBM 25299 (5, 95–112), R/V "Charles H. Gilbert", cruise 98, Kiritimati Atoll, 21 Feb. 1967. KAUM-I. 101109 (1, 196), Japan, Yoron Island, 27°02'57"N, 128°24'19"E, light fishing, near the surface, 28 Jun. 2017. MNHN 1988-1372 (1, 160), 12°40'1.2"S, 48°9'3.6"E, Madagascar, Western Indian Ocean, 595–605 m, 13 Sep. 1973. MNHN 1988-1373 (1, 160), 12°40'1.2"S, 48°9'3.6"E, Madagascar, Western Indian Ocean, 595–605 m, 13 Sep. 1973. MNHN 1998-0883 (1, 193), 17°16'58.8"S, 48°10'58.8"E, Madagascar, Western Indian Ocean, 540 m, 25 Sep. 1973. NMV A 26578-010 (1, 178), 16°59'49"S, 163°30'°16"E, Coral Sea, north New Caledonia, 79 m, 13 Aug. 2011. NMV A 26695-004 (1, 177), NMV A 26695-012 (1, 172), A 26695-015 (1, 134), 16°59'41"S, 163°27'21"E, Coral Sea, north of New Caledonia, 0–114 m, 8 Dec. 2011. NMV A 26731-012 (1, 173), 19°18'22"S, 166°41'59"E, Coral Sea, north of New Caledonia, 0–95 m, 10 Dec. 2011. NMV A 30946-002 (1, 152), 18°02'45"S, 162°43'53"E, Coral Sea, north of New Caledonia, 0–95 m, 7 Dec. 2011.

Tentatively identified. MNHN 1998-0882 (2, 133–182), 15°16'58.8"S, 46°13'1.2"E, Madagascar, Western Indian Ocean, 350–450 m, 22 Jun. 1973.

Diagnosis. Two light organs along orbital margin, one at mid-anterior edge and one at lower margin; dorsal-fin rays 9; anal-fin rays 32–35; prehaemal vertebrae 32–36; total vertebrae 87–91; total lateral line scales 69–77; dorsal-fin origin well before mid-space of V–A; broad black margin on abdominal ridge.

Description. Dorsal-fin rays 9; pectoral-fin rays 12–13 (usually 12); pelvic-fin rays 9; anal-fin rays 32–35 (33). Vertebrae: prepelvic 32–35 (34), prehaemal 32–36 (34); caudal 52–56 (55); predorsal 40–43 (41); preanal 51–55 (54); and total vertebrae 87–91 (89). Gill rakers: upper limb 10, lower limb 28–35 (15–17 on ceratobranchial + 13–18 on hypobranchial). Lateral-line scales: prepelvic 33–34; predorsal 40–41; preanal 53–56; total 69–77 (63–69 large scales + 4–8 small scales at posterior portion).

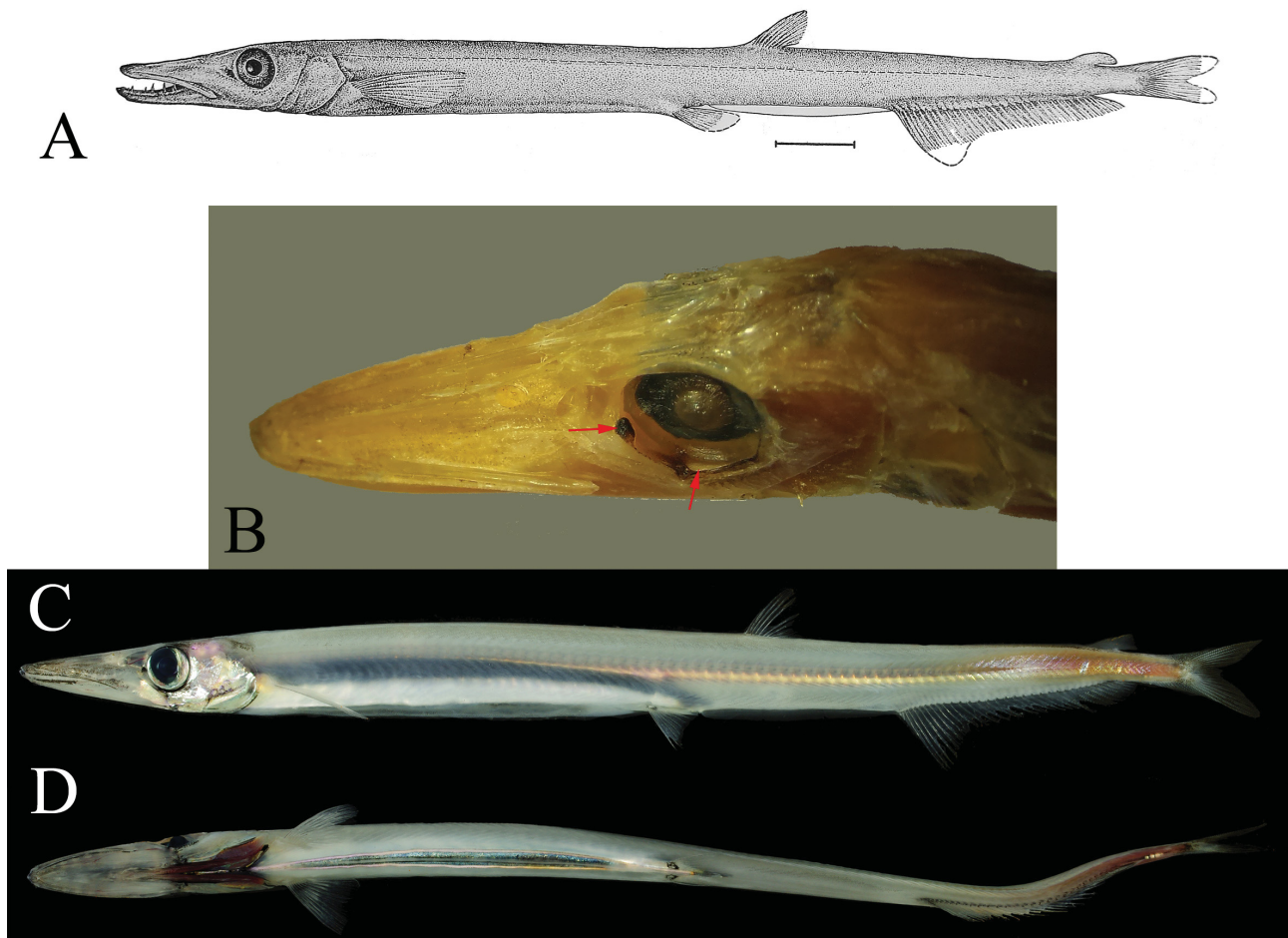


FIGURE 1. *Lestrolepis pofi* (Harry, 1953). A. Original drawing of holotype, from Harry, 1953: fig.6. B. MNHN 1977-1737, arrows indicate two light organs. C–D. freshly caught specimen, KAUM-I.101199, Yoron Island, Japan, photo by H. Hata.

Body slender, elongate, compressed, depth at pectoral-fin base 14.1–15.4 times in SL. Caudal peduncle longer than eye diameter, depth 2.1–2.2% SL. Abdomen with well-developed fleshy ridge and a weakly developed ventral adipose fin between pectoral and pelvic fins; a well-developed ventral adipose fin between anus and anal-fin origin.

Head short, its height same as the rest of body, pointed anteriorly, its length 4.4–5.0 times in SL. Snout moderately long, 1.9–2.0 in HL. Mouth terminal, moderately large; mouth gape extends to slightly beyond a vertical through anterior margin of eye; lower jaw slightly upturned at tip, with a small non-ossified tissue at tip.

Eye moderately large, diameter 5.1–5.9 in HL. Snout short and bluntly pointed. Interorbital space moderately broad and slightly concave; two short ridges on each side, inner ridge extending posteriorly to dorsal surface of skull. Tip of maxilla about third of eye diameter before anterior margin of eye. Nostrils about half eye diameter before tip of maxilla, slightly less than one eye diameter before anterior margin of eye, and on about posterior quarter of snout.

Five gill arches, gill filaments present on first to fourth arches and absent on fifth; fourth gill arch connected to third anteriorly by membrane. Pseudobranch present, in deep pocket lateral to gill arches. Tongue broad, free from mouth floor.

Dorsal-fin origin distinctly behind mid-point of total length, predorsal length 1.6 in SL. Pectoral fin above ventral margin, uppermost ray at about or slightly above lower margin of eye. Pelvic-fin slightly behind mid-point of total length, its origin well in front of that dorsal-fin base, prepelvic length 1.8–1.9 in SL; small axial scale behind pelvic-fin base. Anus near the tip of the depressed pelvic fin, slightly before dorsal-fin origin. Anal fin originating

posterior quarter of the body, preanal fin length 1.3–1.4 in SL. Anal-fin base 5.2–5.8 times in SL. Dorsal adipose small, over posterior portion of anal-fin, base slightly more than half of eye diameter, about twice its base length in front of caudal-fin base.

Front of upper jaw with three slightly enlarged, depressible fangs, followed by a single row of small, curved teeth. Vomerine teeth absent. Palatine with nine enlarged tooth pairs forming two rows, followed by single row of few small pointed teeth. Front of lower jaw with two or three slightly enlarged fangs, followed by two rows of widely spaced small fangs arranged in about eight or nine pairs, outer row fixed and much smaller than depressible inner row. Teeth on tongue small, arranged in one irregular row of 8–10 teeth on each side, absent from anterior portion.

Gill rakers present inner margin of arches, shield shaped, each with 2–3 (usually 3) subequal slender teeth; fifth ceratobranchial with small pointed teeth in a single row; teeth on pharyngeal arch long and pointed, forming small oval patch with about five rows in middle.

Body naked except for lateral line; lateral line incomplete, ending slightly behind middle of caudal-fin base.

Luminous organs present. Two on margin of orbit; one small, dark, rounded, distinct at mid-anterior rim, and one on lower margin usually a slender white luminous tissue at inner side of first infraorbital (Fig. 1B). Ventral luminous duct present on ventral margin of inner surface of abdomen, originating at pectoral-fin base, dividing into two branches along belly at pectoral and pelvic fins (Fig. 1D).

TABLE 1. Morphometric data of *Lestrolepis luxiocula* sp. nov. and *L. pofi*.

	<i>Lestrolepis luxiocula</i> sp. nov.					<i>Lestrolepis pofi</i>
	Holotype	Paratypes				Non-type
SL (mm)	133	140	142	143		137–193 (n=6)
%SL					Mean	Mean (Range)
Head length	21.4	22.2	22.2	21.8	21.9	22.1 (21.8–22.6)
Body depth	7.1	5.5	7.6	7.1	6.8	6.8 (5.5–7.6)
Predorsal	61.6	62.1	62.0	64.3	62.5	62.6 (62.0–64.3)
Prepelvic	54.0	54.3	54.2	55.9	54.6	54.5 (53.3–55.9)
Preanal	74.8	75.7	76.1	76.9	75.9	75.3 (72.3–76.9)
V–D	7.6	7.9	7.7	8.4	7.9	8.1 (7.7–8.8)
V–A	20.8	21.4	21.8	21.0	21.3	20.9 (19.0–21.8)
Snout	11.0	11.1	11.3	11.2	11.2	11.3 (11.1–11.6)
Eye diameter	4.0	4.3	4.2	3.8	4.1	4.2 (3.8–4.4)
Head depth	6.0	5.7	7.2	7.0	6.5	6.4 (5.7–7.2)
Interorbital	2.3	2.1	2.3	2.2	2.2	2.3 (2.1–2.5)
Upper jaw	10.2	10.3	10.3	10.5	10.3	10.3 (10.1–10.5)
Lower jaw	13.5	13.5	13.6	13.8	13.6	13.9 (13.5–14.4)
Pectoral fin	7.7	8.7	9.1	8.0	8.4	9.6 (8.0–12.8)
Caudal peduncle depth	2.2	2.2	2.1	2.2	2.2	2.2 (2.1–2.2)
Caudal peduncle length	4.7	4.0	3.6	4.8	4.3	4.1 (3.6–4.8)
Anal base	19.9	18.5	19.4	17.8	18.9	18.6 (17.8–19.4)
%HL						
Snout	51.2	50.1	50.9	51.6	51.0	51.0 (49.5–52.0)
Eye diameter	18.6	19.2	19.0	17.5	18.6	18.8 (17.5–19.7)
Head depth	28.1	25.5	32.4	32.1	29.5	29.7 (27.5–32.4)
Interorbital	10.5	9.7	10.6	10.1	10.2	10.3 (9.7–10.6)
Upper jaw	47.4	46.2	46.6	48.2	47.1	46.5 (44.9–48.2)
Lower jaw	62.8	60.7	61.1	63.4	62.0	62.8 (60.7–64.5)

Most parts of head, snout, jaws, cheek, operculum and shoulder covered by regular sensory canals.

Coloration. Fresh color (Figs. 1C–D): body creamy white and translucent; broad silver band laterally on posterior fifth of flank; light organ at margin of eye black; dense chromatophores on top of head, jaws (partly), lower margin of eye, and branchiostegal membranes; abdominal ridge with narrow black margin; gill cover silvery white;

pelvic-fin base and pterygiophores of anal fin blackish; anterior portion of dorsal fin, posterior portion of anal fin and entire caudal fin blackish; iris silvery; ventral luminous duct lavender.

Preserved specimens with dorsal quarter covered by dense pigment; light organ on mid-anterior margin of eye black, large dense pigment on lower margin of orbit associated with the light organ; snout and upper margin of lower jaw (lip) brownish; isthmus brownish; gill chamber mostly, but not uniformly, brownish; gill arches and filaments pale; mouth cavity pale; dense pigment along ventral ridges of abdomen; all fin rays and mostly with black dots; adipose fin pigmented; caudal-fin base with dense pigment; ventral adipose fin with scattered chromatophores.

Remarks. Ege (1933) described *Paralepis luetkeni* based on an immature specimen (49.0 mm SL) collected in the Mozambique Channel. He stated that the holotype of *P. luetkeni* is similar to *P. affinis* but differed in several ways. Ege (1953) later reassigned his two previous species, *Paralepis bellottii* and *P. luetkeni*, to junior synonyms of *Lestidium nudum*.

In a brief comment on Ege's (1953) *Lestidium nudum*, Rofen (1960) suggested that all of Ege's specimens should be referred to as *Lestidium luetkeni* (Ege) because of slightly different vertebral counts. Later, Rofen (1966) suggested *L. luetkeni* might possibly be the same as *Lestrolepis pofi* (Harry), but with a question mark. It is believed that subsequent authors (Paxton & Niem, 1999, Nakabo, 2002, Nakabo & Kai, 2013, Fukui & Ozawa, 2004, Mundy, 2005) followed Rofen's suggestion and recognized *Lestrolepis luetkeni* as the valid species. In fact, some of their data were actually taken from either Ege's (1953) *nudum* or those of Rofen's (1960, 1966) *pofi*.

The first author re-examined the holotype of *Paralepis luetkeni* deposited at ZMUC and found it lacked the diagnostic light organ at the mid-anterior of the orbital margin, thereby excluding it from *Lestrolepis*. The light organ (easily seen as a small black dot) develops at an early stage in *Lestrolepis japonica* (ca. 40 mm SL; HCH, pers. obs.) and can easily be seen without magnification. As some other characters are not available (e.g., presence of luminous duct, vertebral counts and lateral-line scale counts) from the holotype, we tentatively re-assign Ege's *luetkeni* to *Lestidiops* based on (1) no light organs around orbit and luminescent duct in abdominal cavity, (2) nostrils well before rear end of maxilla, and (3) well-developed ventral adipose fins. However, a global of *Lestidiops* is needed.

Dor (1970) recorded four specimens of *Lestrolepis pofi* from the Red Sea with a brief description. However, no vouchers could be found to verify his identification. After examining existing specimens at the Hebrew University's Fish Collection (HUJF), we believe that Dor's record was the new species described herein.

Gilbert's (1905) description of *Lestidium nudum* included a light organ on the lower margin of the orbit. However, this character has been overlooked by subsequent authors (e.g. Harry (Rofen), and Post). We found the evidence that at least two species, *Lestidium nudum* and *Lestrolepis pofi*, possess a light organ along the lower rim of the orbit. However, this is absent in the new species described below.

Matsubara (1938) reported 6 specimens of *Lestidium nudum* subsequently described as *Lestidium prolixum* by Harry (1953). Matsubara (1941) reported two further specimens of *Lestidium nudum*, both collected together with *Lestrolepis japonica*, recording 31–33 anal-fin rays. Matsubara (1955) recognized only *Lestidium japonicum* (= *Lestrolepis japonica*) and *Lestidium prolixum* from Japan, which may indicate that his previously reported *L. nudum* are actually *L. prolixum*, not *pofi*.

Hata *et al.* (2018) reported an adult specimen of *Lestrolepis luetkeni* (KAUM-I.101199) and compared it with the holotype data *L. pofi*. Their specimen is in good condition and is clearly *Lestrolepis pofi*.

The two specimens collected from off Madagascar are similar to *L. pofi*, but differ in the number of vertebrae possibly warranting a new name. They also differ slightly in meristic counts, and more specimens are needed to determine the natural species variation.

***Lestrolepis luxiocula* sp. nov.**

Figs. 2A–E; Tables 1–2

Lestrolepis pofi (not of Harry): Dor, 1984:48. Goren & Dor, 1994:13. Golani & Bogorodsky, 2010:61.

Holotype. HUJ 18623 (133 mm SL), 29°32'36.04"N 28°90'34.58"E, Elat, Israel Red Sea 13 Jan. 2001, depth 1–1.5 m, coll. D. Golani.

Paratypes. MNHN 1977-0938 (3, 140–143), 29°34'58.8"N, 34°55'1.2"E, Israel, Red Sea, 13 Apr. 1977.

Non-types. HUJ 6630 (1, 148), Elat, Israel, Red Sea, 20 Feb. 1963, coll. J. Dafni, HUJ 18937 (1, 126), Elat, Israel, Red Sea, 6 Feb. 1961, coll. A. Ben-Tuvia.

Diagnosis. Single light organ at mid-anterior rim of orbit, lower orbital light organ absent; anal-fin rays 31–34; prehaemal 29–30; total vertebrae 79–81; total lateral-line scales 63–65; dorsal-fin origin before mid-space V–A; and no black margin on abdominal ridge.

Description. The values are given for the holotype, followed by all types in parentheses, except where indicated otherwise.

Dorsal-fin rays 9 (7–9); pectoral-fin rays 12 (12); pelvic-fin rays 9 (9); anal-fin rays 34 (31–34). Vertebrae: prepelvic 30 (28–30), prehaemal 29 (29–30); caudal 51 (50–51); predorsal 36 (36); preanal 48 (47–48); and total vertebrae 81 (79–81). Lateral-line scales: prepelvic 30 (30); predorsal 36 (36); preanal 48/49 (48–50); total 63/65 (63–65), 58/59 (58–61) large scales, followed by 4/7 (3–7) small scales at posterior end.

Body moderately elongate, compressed, depth at pectoral-fin base 14.0 (13.2–18.2) in SL. Caudal peduncle longer than eye diameter, its depth 2.2 (2.1–2.2) % SL. Abdomen with well-developed fleshy ridge and a weakly developed ventral adipose fin between pectoral and pelvic fins; ventral adipose fin well-developed between anus and anal fin.

Head short, slightly higher than the rest part of body, bluntly pointed anteriorly, slightly triangular in outline; its length 4.5 (4.5–4.7) in SL. Mouth terminal, moderately large; lower jaw slightly upturned at tip. Mouth gape extends to slightly beyond a vertical through anterior margin of eye; lower jaw barely upturned at tip, bearing a small non-ossified tissue at tip.

Eye large, diameter 5.4 (5.2–5.7) in HL. A single light organ (seen as a black dot) at mid-anterior rim of orbit. Snout short, bluntly pointed, 2.0 (1.9–2.0) in HL. Interorbital space moderately broad and flat, width 9.5 (9.5–10.4) in HL; two short ridges on each side, extended posteriorly to dorsal surface of skull. Tip of maxilla about one third eye diameter before anterior margin of eye. Nostrils well in front of tip of maxilla, on posterior fourth of snout and about two-thirds of eye diameter in front of anterior margin of eye.

Five gill arches, gill filaments present on the first to fourth arches, absent on fifth; fourth gill arch connected with the third anteriorly by membrane. Pseudobranch present, in a deep pocket above gill arches. Tongue broad, free from the mouth floor.

Dorsal-fin origin well behind midpoint of total length, predorsal length 1.6 (1.6) in SL. Pectoral fin well above the ventral margin, the uppermost ray at about same level of lower margin of eye. Pelvic-fin slightly behind midpoint of total length, its origin well in front of dorsal-fin base, prepelvic length 1.9 (1.8–1.9) in SL. Anus at tip of depressed pelvic fin, slightly, but clearly before dorsal-fin origin. Anal fin originating at posterior quarter of body, preanal fin length 1.3 (1.3) in SL. Anal-fin base short, 5.0 (5.0–5.6) in SL. Dorsal adipose fin above rear portion of anal-fin base, ca. 2 times of its base length before caudal-fin base; its base length less than eye diameter.

Front of upper jaw with 2 or 3 slightly enlarged depressible fangs, followed by single row of small curved teeth. Vomerine teeth absent. Palatine with two rows of enlarged teeth on anterior portion, in about 4 (4–6) pairs (outer row fixed and much smaller than depressible inner row) followed by a single row of small pointed teeth. Front of lower jaw with 2–3 slightly enlarged fangs, followed by two rows of widely spaced small fangs, arranged in about 6–7 pairs (outer row fixed and much smaller than depressible inner row). Teeth on tongue small, arranged in one irregular row of 8–10 teeth on each side, absent from anterior portion.

Gill rakers present on inner margin of arches, shield shaped, each with 1–3 (usually 2) subequal slender teeth; tiny pointed teeth on fifth ceratobranchial arranged in single row; teeth on pharyngeal arch long and pointed, forming a small oval patch of about 5 rows in middle.

Body naked, except for the lateral line. Lateral line incomplete, ending at middle of caudal-fin base.

Luminous organ present. One light organ at mid-anterior rim of orbit, no light organ or luminous tissue on lower margin of orbit (Fig. 2E). Luminous duct present on ventral margin of abdomen, originating at isthmus, divided into two branches between pectoral and pelvic fins.

Most parts of head, including snout, jaws, cheek, operculum, and shoulder covered by regular sensory canals.

Coloration. When fresh body translucent with anterior portion of jaws, top of head, upper margin of body, posterior portion of anal fin, caudal fin and upper peritoneal membrane blackish (Fig. 2A). Preserved specimens generally yellowish brown; dense chromatophores on snout, lower lip, lower margin of eye, top of head, posterior portion of anal fin and caudal fin; a black dot (light organ) at front of eye. Luminous duct creamy white.

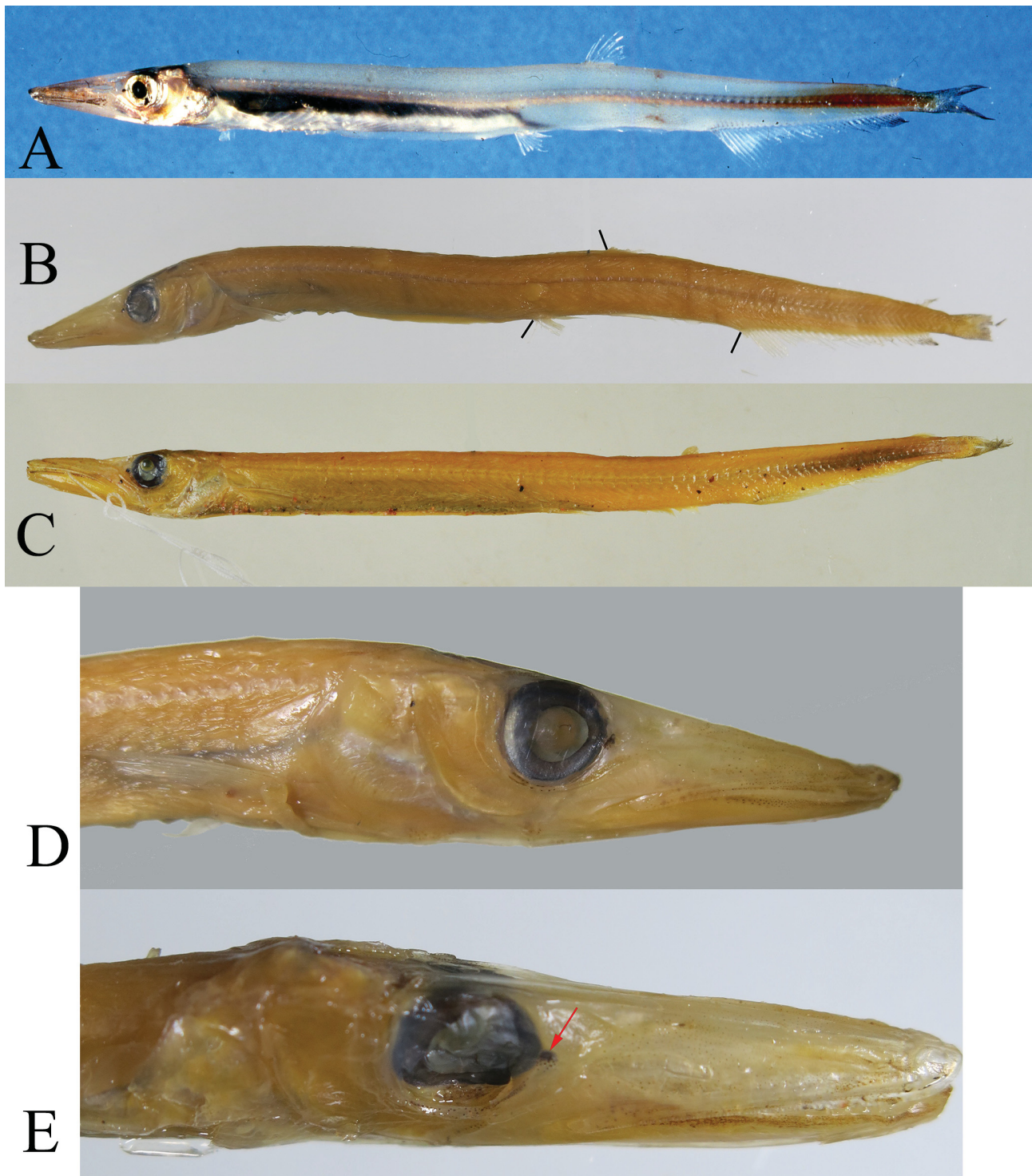


FIGURE 2. *Lestrolepis luxiocula* **sp. nov.** A–B. Holotype, HUJ 18623. A. Fresh caught. B. Preserved, bars indicate origins of pelvic fin (left), dorsal fin (above) and anal fin (right). C. Paratype, MNHN 1977-0938, preserved. D. Lateral view of head, from the holotype. E. Dorsolateral view of head showing the orbital region, arrow indicates front light organ.

Size. The largest specimen examined is 148 mm SL.

Distribution. Only known from the type series collected in the Red Sea; this species appears to be a shallow water dweller collected near the surface.

Etymology. The specific name is a combination of the Latin *lux* (light) and *oculus* (eye), referring to the single light organ at the front margin of orbit.

Remarks. *Lestrolepis luxiocula* **sp. nov.** is most similar to *L. pofi* in the general appearance and body propor-

tions, but differs in the composition of meristics (Table 2). It differs from the two other congeners, *L. intermedia* and *L. japonica*, in having fewer total vertebrae (79–80 vs. 91–98 and 84–89, respectively), and fewer anal-fin rays (31–33 vs. 41–45 and 37–41, respectively).

The three paratypes (MNHN 1977-0938) have only 7 or 8 dorsal-fin rays which is rare in paralepidid. Members of *Lestrolepis* processes 9 dorsal-fin rays in general (Ho, pers. data).

Dor (1970) reported four specimens of *L. pofi* collected from Red Sea (108–142 mm SL). We were unable to locate these specimens and the whereabouts of them is unknown. Dor (1970) recorded 9 dorsal-fin rays, 33 anal-fin rays, and about 70 lateral-line scales in one of his specimen (123 mm SL). Our specimens have 63–65 total lateral-line scales, slightly fewer than Dor (1970). Without examining his specimens, we are unable to verify his value.

TABLE 2. Meristic data of *Lestrolepis luxiocula* **sp. nov.** and *L. pofi*. Values are counted on both sides when available. LLs=lateral-line scales. Vert.=vertebrae

	<i>L. luxiocula</i> sp. nov.		<i>L. pofi</i>	
	Holotype	n=6 Value (frequency)	Holotype	n=23 Range
Dorsal-fin rays	9	7 (1), 8 (2), 9 (3)	9	9
Pectoral-fin rays	12;12	12 (12)	12;12	11–13
Anal-fin rays	34	31 (1), 32 (1), 33 (2), 34 (2)	33	32–35
Pelvic-fin rays	9;9	9 (12)	9;9	9
Prepelvic LLs	30;30	30 (10)	-	33–34
Predorsal LLs	36;36	36 (10)	-	40–41
Preanal LLs	48;49	48 (3), 49 (3), 50 (3)	-	53–56
Total LLs	65;63	63 (3), 64 (3), 65 (4)	71;72	69–77
Prepelvic Vert.	30	28 (1), 29 (4), 30 (1)	34	32–35
Predorsal Vert.	36	36 (6)	41	40–43
Preheamal Vert.	30	29 (5), 30 (1)	34	32–36
Preanal Vert.	48	47 (1), 48 (5)	54	51–55
Precaudal Vert.	51	50 (1), 51 (5)	55	52–56
Total Vert.	81	79 (1), 80 (4), 81 (1)	89	87–91

Comparative materials

Lestrolepis japonica: more than 200 specimens deposited in NMMP-P and KAUM-I collection. *Lestrolepis intermedia*: MCZ 32931 (231), holotype, x-ray film examined, Atlantic Ocean, Caribbean Sea, Cuba, 1861. MCZ 62045 (2, 175–192), Atlantic Ocean, 36°44'N, 74°40'W, 225–350 m, 14 Sep. 1983. MCZ 91583 (1, 178), Atlantic Ocean, North Sargasso Sea, 36°38'N, 74°42'W, 163–248 m, bottom trawl, 10 Mar. 1990. MCZ 91605 (3, 196–188), Atlantic Ocean, North Sargasso Sea, 35°58'N, 74°48'W, 204–242 m, bottom trawl, 11 Mar. 1990. MCZ 158601 (2, 210–223), Atlantic Ocean, United States, 39°44'59"N, 71°52'47" W, 232 m, squid trawl, 24 May 2000. MCZ 162421 (1, twisted), Western Atlantic Ocean, United States, 36°13'N, 74°46'W, 224 m, otter trawl, 9 Mar. 1996.

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References

- Dor, M. (1970) Contributions to the knowledge of the Red Sea No. 44. Nouveaux poissons pour la faune de la Mer Rouge. *Bulletin, Sea Fisheries Research Station, Haifa*, 54, 7–28.
- Dor, M. (1984) *Checklist of the Fishes of the Red Sea*. Israel Academy of Sciences and Humanities, Jerusalem, 437 pp.
- Ege, V. (1933) On some new fishes of the families Sudidae and Stomiidae. Preliminary note. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening, Kjøbenhavn*, 94, 223–236.
- Ege, V. (1953) Paralepididae I (Paralepis and Lestidium). Taxonomy, ontogeny, phylogeny and distribution. *Dana Report*, 40, 1–184.
- Fukui, A. & Ozawa, T. (2004) *Uncisudis posteropelvis*, a new species of barracudina (Aulopiformes: Paralepididae) from the western North Pacific Ocean. *Ichthyological Research*, 51 (4), 289–294.
<https://doi.org/10.1007/s10228-004-0229-3>
- Gilbert, C.H. (1905) The deep-sea fishes of the Hawaiian Islands. In: The aquatic resources of the Hawaiian Islands. *Bulletin of the U. S. Fish Commission*, 23 (2), 577–713, pls. 66–101. [for 1903]
- Golani, D. & Bogorodsky, S.V. (2010) The fishes of the Red Sea--reappraisal and updated checklist. *Zootaxa*, 2463 (1), 1–135.
<https://doi.org/10.11646/zootaxa.2463.1.1>
- Goren, M. & Dor, M. (1994) *An updated checklist of the fishes of the Red Sea. CLOFRES II*. The Israel Academy of Sciences and Humanities, Jerusalem, 120 pp.
- Harry, R.R. (1951) Deep-sea Fishes of the Bermuda oceanographic expeditions. Family Paralepididae. *Zoologica, Scientific Contributions of the New York Zoological Society*, 36 (1), 17–35.
- Harry, R.R. (1953) Studies on the bathypelagic fishes of the family Paralepididae (order Iniomi). 2. A revision of the North Pacific species. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 105, 169–230.
- Hata, H., Tashiro, S. & Motomura, H. (2018) First record of *Lestrolepis luetkeni* (Aulopiformes: Paralepididae) from the Ryukyu Islands, Japan. *Bulletin of Biogeographic Society of Japan*, 72, 277–281.
- Matsubara (1938) Studies on the Deep-sea fishes of Japan VI–VIII. *Journal of the Imperial Fisheries Institute*, 33 (1), 31–66.
- Matsubara, K. (1941) Studies on the deep-sea fishes of Japan XIII. On Prof. Nakazawa's collection of fishes referable to Iso-spondyli, Iniomi and Allotriognathi (2). *Suisan Kenkyu-shi*, 36, 1–10.
- Matsubara, K. (1955) *Fish morphology and hierarchy. Part 1*. Ishizaki Shoten, Tokyo, 789 pp. [in Japanese]
- Mundy, B.C. (2005) Checklist of the fishes of the Hawaiian Archipelago. *Bishop Museum Bulletins in Zoology*, 6, 1–703.
- Nakabo, T. (2002) *Fishes of Japan with pictorial keys to the species, English edition*. Tokai University Press, Tokyo, 1749 pp.
- Nakabo, T. & Kai, Y. (2013) Paralepididae, barracudinas. In: Nakabo, T. (Ed.) *Fishes of Japan with pictorial keys to the species. 3rd Edition*. Tokai University Press, Hadano, pp. 439–443 + 1857–1858.
- Paxton, J.R. & Niem, V.H. (1999) Family Paralepididae In: Carpenter, K.E. & Niem, V.H. (Eds.), *Species identification guide for fisheries purposes. The living marine resources of the western central Pacific. Batoid fishes, chimeras and bony fishes part 1 (Elopidae to Linophrynidae). Vol. 3*. FAO, Rome, pp.1948–1949.
- Rofen, R.R. (1960) Biological results of the Snellius expedition XIX Reidentification of the bathypelagic fishes of the family Paralepididae collected by the Snellius Expedition in the East Indies. *Temminckia*, 10, 200–208.
- Rofen, R.R. (1966) Family Paralepididae. In: Mead, G., Bigelow, H.B., Breder, C.M., Cohen, D.M., Merriman, D., Olsen, Y.H. Schroeder, W.C., Schultz, L.P. & Tee-Van, J. (Eds.), *Fishes of the Western North Atlantic. Memoirs of the Sears Foundation of Marine Research Mem*, 1 (5), pp. 205–461.
<https://doi.org/10.2307/j.ctvbc095.15>